1-1-1906

A List of Fishes of Montana with Notes on the Game Fishes, 1906

University of Montana--Missoula. Biological Station, Flathead Lake

James A. Henshall

BULLETIN UNIVERSITY OF MONTANA, NO 34
BIOLOGICAL SERIES No. 11

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With Notes on the Game Fishes

by

James A. Henshall, M. D.

Superintendent of Bozeman Station, U. S. Bureau
of Fisheries.

AUTHOR OF "Book of the Black Bass",
"Camping and Cruising in Florida",
"Ye Gods and Little Fishes",
"Bass, Pike, Perch and
Others", Etc., Etc.

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LETTER OF TRANSMITTAL.

Prof. O. J. Craig, University of Montana:

Dear Sir:—This paper was presented to the Montana Academy of Sciences, Arts and Letters, at its second annual meeting held at Anaconda, Mont., December 29-31, 1903. The Academy has not developed sufficient strength to have its transactions printed. Dr. Henshall's paper contains matter that is worthy of permanent record as a contribution to the natural history of the state, and will be followed by a more elaborate paper with keys and descriptions. I therefore recommend its publication as a bulletin of the University.

MORTON J. ELROD,
President Montana Academy of Sciences, Arts and Letters.

Fishes of Montana.

By Dr. James A. Henshall, U. S. Bureau of Fisheries.

But thirty-six species of fishes have so far been recorded as native to the waters of Montana, as embraced in the following catalogue. Several of the species have been identified from the descriptions of Lewis and Clark, but most of them were collected by the Government Railroad Surveys in the Missouri River below the Great Falls, and of late years a few have been collected by the U. S. Bureau of Fisheries.

Family **ACIPENSERIDAE.**

1. **Scaphirynchus platorynchus** (Rafinesque.) Shovel-nose Sturgeon.
   Missouri River at Fort Benton.

Family **SILURIDAE.**

2. **Ictalurus punctatus** (Rafinesque). Channel Catfish; White Catfish.
   Missouri River at mouth of Beauchamp Creek and at Great Falls; Milk River; Yellowstone River.
3. **Noturus flavus,** Rafinesque. Stone Catfish.
   Missouri River, near Craig.

Family **CATOSTOMIDAE.**

4. **Carpiodes velifer** (Rafinesque). Quill-back; Carp Sucker.
   Milk River; Poplar River.
5. **Pantosteus jordani,** Evermann. Jordan's Sucker.
   Sweet Grass Hills; Red Rock River; Beaverhead River.
6. **Catostomus discobolus,** Cope. Big-mouth Sucker.
   Red Rock River; Beaverhead River.
7. **Castostomus griseus** (Girard). Gray Sucker.
   Milk River; Yellowstone River; Gardiner River; Poplar River.
8. **Catostomus catostomus** (Forster). Long-nose Sucker.
   Little Blackfoot River; Jocko River; Lolo Creek; Browns Gulch Creek.
9. **Catostomus macrocheilus** (Girard). Columbia River Sucker.
   Swan Lake; Post Creek; presumably in Flathead Lake.
10. **Catostomus commersonii** (Lacepede). White Sucker.
    Milk River; Poplar River.
11. **Minytrema melanops** (Rafinesque). Spotted Sucker.
    Yellowstone River.
12. **Moxostoma aureolum** (Le Sueur). Red Horse Sucker; Mullet.
    Poplar River.

Family **CYPRINDAE.**

13. **Hybognathus nuchalis,** Agassiz. Silvery Minnow.
    Poplar River.
14. **Hybognathus argyritis,** Girard. Little Silvery Minnow.
    Milk River.

15. **Pimephales promelas,** Rafinesque. Black-head Minnow.
Milk River; Yellowstone River.
16. **Mylocheilus caurinus** (Richardson). Columbia River Chub; "Whitefish." Flathead Lake; Bitter Root River.
17. **Ptychocheilus oregonensis** (Richardson). Squaw-fish.
Flathead Lake; Bitter Root River; Lolo Creek.
18. **Leuciscus balteatus** (Richardson). Banded Minnow.
Brown's Gulch Creek, at Silver Bow.
19. **Notropis atherinoides,** Rafinesque. Silverside Minnow.
Poplar River.
20. **Rhinichthys cataractae dulcis** (Girard). Long-nose Dace.
Beaverhead River; Red Rock River; Poplar River; Little Blackfoot River; Browns Gulch Creek; Bridger Creek.
21. **Hybopsis gelidus** (Girard). Cold-water Minnow.
Milk River.
22. **Hybopsis montanus,** Meek. Montana Minnow.
Upper Missouri region.
23. **Couesius dissimilis** (Girard). Milk River Minnow.
Milk River; Poplar River.
24. **Platygobio gracilis** (Richardson). Fat-head Chub.
Milk River; Yellowstone River; Missouri River; Judith River; Poplar River.

Family **HIODONTIDAE.**

25. **Hiodon alosoides** (Rafinesque). Moon Eye.
Missouri River Falls; Poplar River.
26. **Hiodon tergisus,** Le Sueur. Toothed Herring.
Missouri River; Judith River.

Family **SALMONIDAE.**

27. **Coregonus williamsoni cismontanus,** Jordan. Rocky Mountain Whitefish. East Montana generally.
28. **Salmo clarkii,** (Richardson). Red-throat Trout.
Both slopes of the Rocky Mountains.
29. **Cristivomer namaycush** (Walbaum). Mackinaw Trout; Lake Trout.
Elk Lake, Madison County.
30. **Salvelinus parkei** (Suckley). Bull Trout; Dolly Varden Trout; Red spotted Trout.
Rattlesnake Creek, and west Montana generally.

Family **THYMALLIDAE.**

31. **Thymallus montanus,** Milner. Grayling.
Tributaries of the Missouri above the Great Falls.

Family **GASTEROSTEIDAE.**

32. **Eucalia inconstans** (Kirtland). Stickleback.
Poplar River.

Family **PERCIDAE.**

33. **Stizostedion canadense boreum** (Girard). Northern Pike-perch.
Great Falls of the Missouri; Milk River; Marias River.

Family **SCIAENIDAE.**

34. **Aplodinotus grunniens,** (Rafinesque). Fresh-water Drumfish.
Milk River.

Family **COTTIDAE.**

35. **Cottus semiscaber** (Cope). Bull-head; Blob.
Streams of east and west Montana, generally.

Family **GADIDAE.**

36. **Lota maculosa** (Le Sueur). Ling.
Red Rock River; Red Rock Lake; Poplar River; Missouri River.

To this list may be added the following species planted in Montana waters by the U. S. Bureau of Fisheries:

Family **SALMONIDAE.**

Coregonus clupeiformis (Michill). Lake Superior Whitefish.
Planted in Flathead Lake.

Salmo gairdneri, Richardson. Steelhead Trout; Salmon-trout.
Planted in numerous streams in Montana.

Salmo irideus, Gibbons. Rainbow Trout.
Planted in numerous streams in Montana.

Salmo fario, Will. Brown Trout; Von Behr Trout.
Gallatin County, Hoffman's Ranch.

Christivomer namaycush (Walbaum). Mackinaw Trout; Lake Trout.
Flathead Lake.

Salvelinus fontinalis (Mitchill). Eastern Brook Trout.
Numerous waters in Montana .

Family **CENTRARCHIDAE.**

Micropterus dolomieu, Lacepede. Small-mouth Black Bass.

Micropterus salmoides (Lacepede). Large-mouth Black Bass.

The two species of black bass, principally the large-mouth, have been planted in some waters of the western portion of the state, on the Pacific slope, where the water is much warmer than in eastern Montana; and in the Missouri River near Great Falls, also in a lake just above Great Falls, formed by the dam of an electric power company. The colder waters of the eastern part of the state are totally unsuited to black bass; moreover, they should never be planted in ponds or streams containing trout.

Family **PERCIDAE.**

Perca flavescens (Mitchill). Yellow Perch.

The yellow perch has been introduced in the artificial lake mentioned, near Great Falls, where they have multiplied to such an extent as to afford good fishing.

In 1889 and 1890 there were planted in the waters of the Yellowstone National Park yearling fish of the following species by the U. S. Bureau of Fisheries:

Date.	Place.	Species.	Number.
Sept. 22, 1889	Gardiner River	Brook Trout	4,975
Sept. 15, 1890	Gardiner River	Brook Trout	7,875
Sept. 22, 1889	Gibbon River	Rainbow Trout	990
Sept. 22, 1889	Firehole River	Loch Leven Trout	995
Sept. 2, 1890	Lewis Lake	Loch Leven Trout	3,350
Sept. 2, 1890	Shoshone Lake	Loch Leven Trout	3,350
Sept. 22, 1889	Gardiner River	Mountain Trout	968
Aug. 9, 1890	Shoshone Lake	Lake Trout	18,000
Aug. 23, 1890	Shoshone Lake	Lake Trout	7,262
Aug. 23, 1890	Lewis Lake	Lake Trout	7,263
Sept. 2, 1890	Lewis Lake	Lake Trout	4,750
Sept. 2, 1890	Shoshone Lake	Lake Trout	4,750
Sept. 15, 1890	Nez Perces Creek	Von Behr Trout	9,300
Oct. 3, 1899	Twin Lakes	Native Whitefish	2,000
Oct. 15, 1899	Yellowstone River	Native Whitefish	980
Aug. 15, 1890	Yellowstone River	Native Whitefish	5,000
Sept. 11, 1890	Yellowstone River	Native Whitefish	5,000

Excepting the Yellowstone and Gibbon Rivers, and possibly the east fork of the Gardiner, there were previously no fish whatever in any of these streams or lakes.

As one result of these plantings there have been taken in the Madison and Yellowstone rivers or tributaries in Montana the eastern brook trout, the rainbow trout and the Von Behr or brown trout.

Owing to the great size of the state of Montana, with its climatic peculiarities and the consequent differences in the temperature and condition of the waters of the east, west and northern portions, it is remarkable that so few species of native fishes have as yet been discovered. It is but fair to state, however, that its waters have not been fully explored, and additions to its fish fauna will no doubt result from more thorough investigations of its streams and lakes.

It will be noticed that but few food-fishes, good, bad or indifferent, are included in the foregoing list of native fishes. Those of the Missouri below the falls being the channel catfish, the several suckers, the northern pike-perch and the fresh-water drumfish. By far the best game- and food-fishes are those of the mountain streams, as the red-throat trout, grayling and Rocky Mountain whitefish of the eastern slope of the Rockies, and the Dolly Varden or bull trout of the west slope. They are the most important for the angler or for the table, and thrive in the cold streams of both sides of the Continental Divide. If proper legislation was enacted to prevent their destruction by irrigating ditches they would soon become abundant in all suitable waters.

The law prohibiting the sale of trout and grayling is the most important, and in fact the only one, for fish protection in the statutes of Montana, and were it repealed the fishes of the mountain streams would soon be few and far between.

In view of their importance perhaps it may be well to refer more particularly to the fishes of the salmon family, both native and introduced, in order that their merits may be more fully recognized and better laws adopted for their preservation.

THE RED-THROAT TROUT (Salmo Clarkii).

The red-throat trout, or native trout, is the most widely distributed of all the native fishes of Montana. It inhabits both slopes of the Rocky Mountains, and, as might be inferred from this extensive range, it varies in external appearance more than any of the trout species. There are a dozen or more well-defined sub-species or geographical varieties, but all have the characteristic red splashes on the membrane of the throat. By means of this "trade-mark" it may be readily distinguished from the rainbow or steelhead trouts, both of which are also black-spotted.

But while the red-throat trout varies considerably in contour, coloration and markings, in different localities, it is identical in structure wherever found. It is known by the U. S. Bureau of Fisheries as the "black-spotted trout," a most unfortunate designation, inasmuch as the rainbow and steelhead trouts are also "black-spotted." The name red-throat trout is distinctive, and is preferable to the rather repulsive name of "cut-throat" trout by which it is also known. The red-throat trout is designated in Montana by such names as "trout," "brook trout," "speckled mountain trout," etc. As the eastern red-spotted "brook trout" is rapidly being introduced to our waters, the name "brook trout" should be applied only to that species.

Where the red-throat trout grows to a larger size than usual, as in the Yellowstone and other lakes, it is often called "salmon-trout", and the bull trout of the west slope is also sometimes known by the same name, but the only "salmon-trout" is the steelhead trout. The red-throat trout rises to the fly more freely than eastern brook trout, though in gameness and flavor it is hardly its equal. Its habits are also somewhat different. It usually lies in pools and holes, and does not frequent the riffles so much as the eastern trout. In size it is somewhat larger than the eastern trout in streams of the same relative width and depth, and like all trout species grows bigger in lakes and large streams. I have taken them on the fly weighing from three to five pounds in Soda Butte Lake in the Yellowstone Park, and in Yankee Jim Canyon on the Yellowstone River. It seldom breaks water when hooked, but puts up a vigorous fight beneath the surface. In Yellowstone Lake it is infested with the white pelican parasite, rendering it emaciated and lacking in game qualities; this condition, however, seems to be disappearing somewhat, while those in the river are well-nourished and gamy. Under favorable conditions it grows rapidly. One taken from a pond near Toston, supplied from Bozeman Station, weighed three pounds, dressed, when two years old.

THE STEELHEAD TROUT. (Salmo gairdneri).

The steelhead, or salmon-trout, is the trimmest and most graceful and the gamest of all the trout species, being more "salmon-like" in shape and appearance. On the Pacific coast, where it is native, and runs to salt water, it grows to twenty pounds or more in weight, when it is known as steelhead salmon, and many are packed under this name. Its spots are smaller than in the other black-spotted species. It has, usually, especially the males, a pink flush along the sides, but not so pronounced

as in the rainbow trout. Its color is also of a lighter hue, with steely reflections. Its scales are somewhat larger than those of the red-throat, but not so large as in the rainbow.

During the past six years the U. S. Bureau of Fisheries has introduced the steelhead in a number of streams and lakes in Montana, which seem to be very suitable for this fine fish. They have been caught during the past year or two as heavy as four pounds, which shows that they have come to stay. The steelhead rises eagerly to the artificial fly, and breaks water repeatedly when hooked; it is very trying to light tackle, and must be handled carefully by the angler. As a food-fish it excels all other trout, as might be surmised. It should grow to eight or ten pounds in lakes of considerable area and depth, and where its food is plentiful.

THE RAINBOW TROUT. (Salmo irideus).

The rainbow trout has also been introduced to Montana waters during the past few years by the U. S. Bureau of Fisheries, and seems to be well-adapted to ponds of considerable extent, where water plants and grasses flourish. Such waters seem to be more congenial than the colder mountain streams; and moreover it has a way of disappearing from the smaller streams to seek those of greater depth. It will thrive in warmer water than the other trouts. The rainbow is similar in contour to the red-throat, though somewhat deeper, and with shorter head, smaller mouth, and larger scales. Its distinguishing feature is the broad red band along the lateral line, common to both male and female. It is a handsome fish, with considerably more gameness than the red-throat, but is not so vigorous on the rod as the steelhead of the same size. Owing to its tendency to descend streams it is particularly liable to enter irrigation ditches, in which event its doom is sealed. As a food-fish it is superior to the native red-throat trout.

THE BROWN TROUT. (Salmo fario).

The brown trout is the brook trout of Europe, and was introduced to the United States from England and Germany, under the auspices of the U. S. Bureau of Fisheries. Those from Germany, (the eggs), were donated by Von Behr, and his name was unfortuately applied to the fish as "Von Behr trout," also "German trout." As the fish is universally known in Great Britain as the "brown trout", that name should be adhered to in this country as well. It is the trout of Izaak Walton, and the German names are cerainly inapplicable. In Germany it is known as "bach-forelle", which means "brook trout." It is neither so gamy nor so good a food-fish as our own trouts, though it grows quite large in suitable waters, or those of higher temperature than required for our native trouts.

It has both reddish-brown and black spots, of a larger size than those of its American cousins. In 1899 a lot of fingerlings were supplied by the U. S. Bureau of Fisheries, to Hon. C. W. Hoffman, who placed them in a pond on his ranch, a mile from Bozeman. Last summer (1903) two were taken from the pond weighing six pounds, a remarkable growth in four years; though this weight was doubtless attained at the expense of

the small trout of other species in the same pond. I saw a mounted specimen that was taken in a tributary of the Yellowstone near Livingston that was said to weigh ten pounds when captured, which was probably correct, as it was thirty inches long.

THE BROOK TROUT. (Salvelinus fontinalis),

The eastern brook trout has both crimson and yellowish spots, with dark marblings on the back. At spawning time the males have the lower part of the body bright scarlet, of a more intense color than the other species mentioned. The paired fins are bordered with both black and white lines. It is the most beautiful of all the trouts. As a game- and food-fish it ranks high, but is excelled in game qualities by both the rainbow and steelhead, which, however, is no disparagement. It has been introduced of late years from Bozeman Station to many ponds and streams thoughout the state, where it has uniformly done well. One was taken on the fly from the pond of Mr. Hoffman, previously referred to, that weighed three and one-half pounds at three years of age. I also know of two being taken from a tributary of the Madison, near Ennis, where they were planted by the U. S. Bureau of Fisheries, that weighed respectively one and one-half and two pounds at one and a half years of age. Two of the same hatching were taken the same autumn of like weights in Bridger Creek. The low temperature of the east Montana waters seems to be eminently suitable for the brook trout.

The DOLLY VARDEN TROUT. (Salvelinus parkei).

The Dolly Varden, or bull trout, sometimes erroneously called "salmon-trout," is the only red-spotted trout native to western waters. It belongs to the same genus as the eastern brook trout, but grows much larger. It is found in Montana only on the Pacific slope in both lakes and streams, growing to twelve or fifteen pounds under favorable conditions. In the streams it is a gamer fish than in lakes, though the larger fish are rather lazy and logy. Compared with its eastern relative it is hardly so vigorous on the rod, when of similar weight, and not quite so good for the table.

THE LAKE TROUT. (Cristivomer namaycush .

The lake trout is closely allied to the eastern brook trout, though it grows very much larger, and is confined to very deep lakes. In the Great Lakes it often reaches forty pounds in weight, and is stictly a commercial fish, though it is often taken by deep trolling with the minnow. It never rises to the artificial fly. I have taken it on the trolling spoon In the Straits of Mackinaw, and in the bay at Marquette on Lake Superior. It is one of the best fresh-water food-fishes. Its spots are large and of a grayish coloration.

In the books it has never been credited to Montana, though it exists in Elk Lake at the head of the Jefferson, but nowhere else so far as I am aware west of of Lake Michigan, which is likewise true of the grayling. It is credited in the books to Henrys Lake, Idaho, but this is a mistake which I corrected a year or two ago. Many years ago it was taken at Elk Lake by Mr. Sawtelle and Mr. Sherwood, of Henrys Lake, and not knowing what it was they forwarded specimens to the Smithsonian Insti-

tution, where it was identified as the lake trout. As it was sent from the postoffice at Henrys Lake the inference was that it came from that lake. Henrys Lake is a very shallow body of water, quite weedy, and not at all adapted to this deep water fish. I have collected it from Elk Lake, weighing several pounds. Eggs from Lake Superior whitefish and lake trout have been hatched at the Bozeman Station and several millions of the resultant fry have been deposited in Falthead Lake, where it is hoped they will find a congenial home.

THE GRAYLING. (Thymallus montanus).

The grayling, the "lady of the streams", is as trim and graceful, and withal as beautiful as a damsel dressed for her first ball. Her lovely iridescent colors and tall gaily-decorated dorsal fin, which might be compared to a gracefully waving plume, must be seen fresh from the water to be properly appreciated. The grayling is not only a clean and handsome fish, but is as game as the trout, and in my opinion much better for the table. It was taken in the Jefferson river a century ago by Lewis and Clark, and though they gave a fair description of it in the history of their wonderful expedition, it remained unidentified until it became my good fortune a few years ago to recognize it as the grayling from the description of Captain Lewis.

The grayling is supposed by some to be a cross between the redthroat trout and the whitefish, in other words a hybrid; but I have never seen a hybrid fish in wild waters. Hybrids can be produced by the fishculturist between closely allied species, but the progeny is infertile. The grayling is a distinct species, allied to the salmon family, more distinct in fact than as between the rainbow and steelhead trouts. It is a different species from the Michigan or Arctic graylings, though closely resembling both. It became my good fortune, also, to be the first to propagate the grayling artificially, under the auspices of the U. S. Bureau of Fisheries, it having time and again resulted in failure with the Michigan grayling.

The grayling is found only in Alaska, Michigan and Montana. In Montana it exists only in the tributaries of the Missouri River above the Falls. Its ideal home is in the upper reaches of the Madison and Jefferson. The upper canyon of the Madison and the basin west of the Yellowstone Park are especially adapted to the grayling. There the water is swift, but unbroken, the bottom being composed of dark obsidian sand. In this region grayling of two pounds are not uncommon.

THE ROCKY MOUNTAIN WHITEFISH. (Coregonus williamsoni cismontanus).

For some inexplicable reason this fine game-fish is not properly appreciated by many anglers in Montana. This is probably mere prejudice, but it seems unaccountable when it is considered that there are only two other game-fishes in the eastern portion of the state—the redthroat trout and the grayling. I consider the whitefish equal to the native trout in gameness, as eager in rising to the artificial fly, as ready to respond to bait, and as good, if not better, as a food-fish. Its flesh is firm and flaky, of a sweet flavor, and never has that muddy or earthy taste as in trout from weedy waters.

PADDLE WHEELS FOR DITCHES.

To Prevent Destruction of Fish by Irrigating Ditches.

(From FOREST AND STREAM, March 14, 1903.)

In Forest and Stream of February 14, is an article with the caption "Montana Game and Fish Interests," giving extracts from the semi-annual report of the State Warden, Mr. W. F. Scott. I wish to call attention to certain portions of said report. He says: "It is a matter of serious regret that no practical method has been adopted to prevent the great loss of trout which escape through the irrigating canals and ditches out on to the land, and perish, during the irrigating season, other than the common wire mesh screen which clogs up and retards the flow of water in the spring and autumn when drift matter and leaves are brought down by the current of the stream."

It is both disheartening and discouraging to the western fishculturist to know that millions of fish, both large and small, annually perish through being stranded on the meadows and grain fields as the result of unscreened ditches. He sees a large percentage of the work of the United States and State Fish Commissions go for naught from this cause.

The hardship entailed by the use of the common wire mesh screen exists more in imagination than in reality, for during the season of irrigation in the summer the streams are clear of leaves and trash. "In the spring and autumn when drift matter and leaves are brought down by the the current of the stream," the head gates of the ditches could be closed, for at those seasons rain or snow usually furnishes all the water needed for the crops.

But in order to provide a contrivance "which will not injure or work a hardship on the farmer, and at the same time put an end to this wide-spread destruction," I have devised an arrangement to be put in at the intake of ditches that is as effective as a screen, but which is not open to its objections, as it permits the passage of such matter as would clog a screen, and at the same time it prevents fish from entering the ditch. I understand that some such device is successfully used in Colorado, but I have not been able to obtain the particulars of its construction.

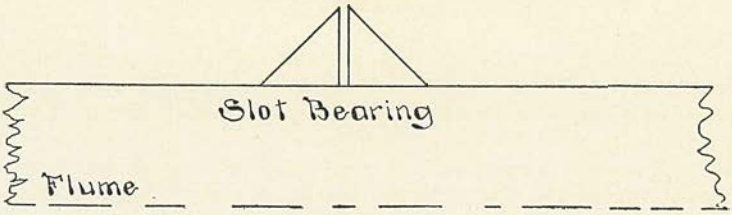
My device is very simple, consisting merely of a short flume at the head of the ditch, with sufficient fall to operate an eight-bladed paddle wheel, fitting the flume closely. The width and depth of the flume, and the size of the paddle wheel would be governed by the width and depth of the ditch. If very wide a double flume and two wheels could be used. In large ditches two old wagon wheels could be utilized by affixing paddles to the spokes. The bearings of the shaft should work in vertical slots, so that any hard substance could pass under the paddles by raising the wheel. The continual splashing of the paddles would be effectual in frightening fish or fry and prevent their passage.

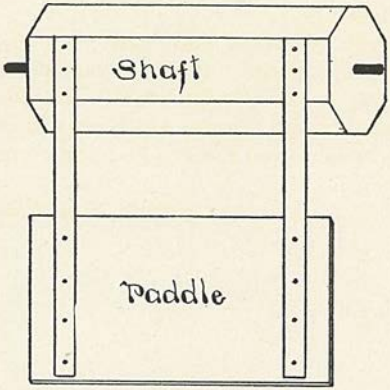
But to make assurance doubly sure, a barrel-shaped frame covered with woven wire of very small mesh, and fitting the flume closely, could be operated as a revolving screen, by utilizing the paddle wheel as a motor. The pulleys to each should be placed on the shafts just outside of the flume, with the belt crossed so as to cause the wheel and screen to revolve in opposite directions, the revolving screen, of course, being at the entrance of the ditch. This forms a self-cleaning screen, all leaves and trash being carried over, while the smallest fish fry are prevented from passing it. I think, however, that the paddle wheel alone would answer the purpose very effectually.

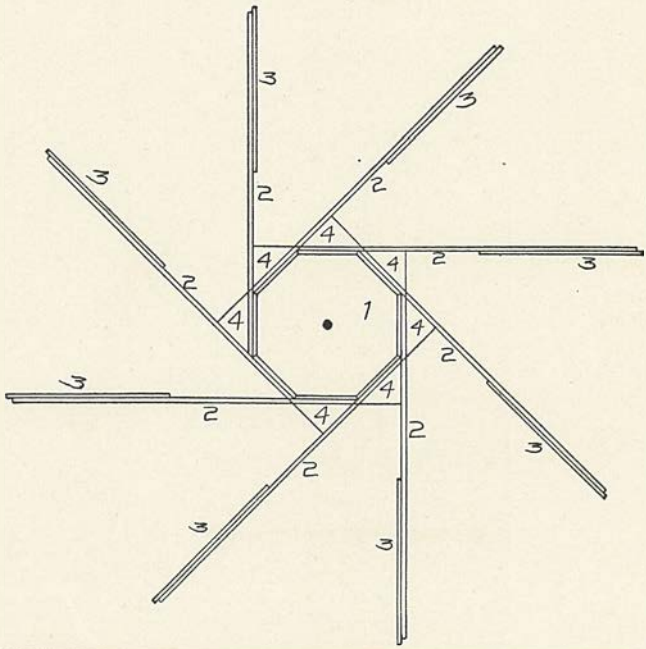
The annexed rough drawings may make the device and its construction more easily understood. For very shallow ditches the paddles might be nailed directly to the octagon shaft. Farmers who are skilled in the use of tools might make a round shaft, with mortises for the arms of the wheel, but it would be no better or stronger than the simple one mentioned.

JAMES A. HENSHALL,

Bozeman, Montana.







CROSS SECTION OF WHEEL.

1. OCTAGON SHAFT. 2. ARMS.
3. PADDLES. 4. BRACES.